outer portion of the fan jet casing **120** comprises an aluminum alloy. The portion of the fan jet casing that extends annularly around the fan blade region **130**, is thicker than the other portion of the fan casing to provide energy absorbing capability. Since fan blade fragments are more likely to impact this region of the fan casing, this region **130** must be thicker in order to prevent any fan blade fragments from penetrating the fan casing. As is conventional, the fan jet casing **120** includes stiffening ribs **105** and **110** which surrounds a fan (not shown). The fan jet casing **100** also includes an annular honeycomb region **140** that absorbs some of the energy of any blade fragments that impact the honeycomb region. A shallow depression in the honeycomb region contains an rub strip **150** against which blade tips (not shown), are closely fitted for providing a sealing area **160** for reducing the amount of air leaking over the tips (not shown). Rub strip **150**, is an abradable shroud material which may be easily and smoothly worn away by the tip of the blades (not shown) during the initial run so that as tight a tip seal as possible is obtained. Since this material and the technique for its use is conventional, it will not be further detailed herein.

Referring now to FIG. **3** there is shown an exemplary fan jet engine **200** employing an embodiment of the present invention. The outer portion of the fan jet casing **220** comprises an aluminum alloy. Since fan blade fragments are more likely to impact this region of the fan casing, this region must have sufficient energy absorbing ability to prevent any fan blade fragments from penetrating the fan casing. In this embodiment of the present invention, the additional energy absorbing material required to prevent fan blade fragments from penetrating is achieved through the use of a polyurethane layer **280** and/or the use of a woven fabric reinforcement such as KEVLAR® fabric or fiberglass. The polyurethane layer **280** has a thickness from about 10 mils to about 100 mils instead of aluminum alloy. The fan jet casing also includes a typical annular honeycomb region **280** that absorbs some of the energy of any blade fragments that impact the honeycomb region. The fan jet casing also includes stiffening ribs **210** which surrounds a fan (not shown). However, rather than being used to stiffen the area directly over the fan blades, the ribs **210** only appear at the edges of the region directly over the honeycomb region **240** with ribs such as **105** being eliminated, since the polyurethane layer **280** provides sufficient strength and stiffening to the outer portion of the case **200**. A shallow depression in the honeycomb region contains an rub strip **250** against which blade tips (not shown), are closely fitted for providing a sealing area **260** for reducing the amount of air leaking over the tips (not shown). Rub strip **250**, is an abradable shroud material as is well-known in the art which may be easily and smoothly worn away by the tip of the blades (not shown) during the initial run so that as tight a tip seal as possible is obtained. Since this material and the technique for its use is conventional, it will not be further detailed herein.

The surface of the aluminum alloy portion of the fan casing **235** where the polyurethane resin is to be attached is first treated with a PAA etch treatment prior to the application of the polyurethane resin. The surface of the fan casing is coated with a spray primer to achieve a preselected cured primer thickness. The amount of primer coat **270** thickness applied to the fan casing preferably is sufficient to obtain a cured thickness between about 0.00002 and about 0.00020 inches. In a preferred embodiment, the primer is TY-PLY BN®, a proprietary non-chromated primer available from Lord Corporation of Erie, Pa.

While the invention has been described with reference to a preferred embodiment, it will be understood by those skilled in the art that various changes may be made and equivalents may be substituted for elements thereof without departing from the scope of the invention. In addition, many modifications may be made to adapt a particular situation or material to the teachings of the invention without departing from the essential scope thereof. Therefore, it is intended that the invention not be limited to the particular embodiment disclosed as the best mode contemplated for carrying out this invention, but that the invention will include all embodiments falling within the scope of the appended claims.

What is claimed is:

1. A blade containment structure surrounding a fan in a fan jet engine comprising:

a honeycomb structure spaced radially outwardly from and surrounding tips of rotating blades of said fan, said honeycomb structure having an outer wall;

a polyurethane projectile shield surrounding the outer wall of said honeycomb structure; and

said polyurethane projectile shield having sufficient energy absorbing capability to contain blades and fragments of said blades thrown outward by damage to said fan.

2. A blade containment structure surrounding a fan in a fan jet engine comprising:

a honeycomb structure spaced radially outwardly from and surrounding tips of rotating blades of said fan, said honeycomb structure having an outer wall;

a polyurethane and fabric projectile shield surrounding the outer wall of said honeycomb structure; and

said polyurethane projectile shield having sufficient energy absorbing capability to contain blades and fragments of said blades thrown outward by damage to said fan.

3. The blade containment structure of claim **2**, wherein the fabric comprises a material selected from the group consisting of KEVLAR® fabric and fiberglass and combinations thereof.

4. The blade containment structure of claim **3**, wherein the fabric comprises a plurality of layers of KEVLAR® fabric.

5. The blade containment structure of claim **3**, wherein the fabric comprises a plurality of layers of fiberglass.

6. The blade containment structure of claim **3**, wherein the projectile shield comprises a plurality of layers of polyurethane, wherein each layer of the plurality of layers of polyurethane is positioned adjacent to a layer of fabric.

7. The blade containment structure of claim **3**, wherein the projectile shield comprises a plurality of layers of polyurethane alternating with a plurality of layers of KEVLAR® fabric.

8. The blade containment structure of claim **3**, wherein the projectile shield comprises a plurality of layers of polyurethane alternating with a plurality of layers of fiberglass.

9. The blade containment structure of claim **3**, wherein the fabric and polyurethane projectile shield comprises a layer of polyurethane and one layer of KEVLAR® fabric, wherein the layer of KEVLAR® fabric is encapsulated within the layer of polyurethane.

10. The blade containment structure of claim **3**, wherein the fabric and polyurethane projectile shield comprises a layer of polyurethane and a layer of KEVLAR® fabric, the layer of KEVLAR® surrounding the layer of polyurethane.

11. The blade containment structure of claim **3**, wherein the fabric and polyurethane projectile shield comprises two layers of polyurethane and an intermediate layer of KEVLAR® fabric.

12. The blade containment structure of claim **3**, wherein the fabric and polyurethane projectile shield comprises a first layer of polyurethane surrounding the outer wall of the honeycomb structure, a first layer of epoxy film surrounding the first layer of polyurethane, a layer of KEVLAR® fabric